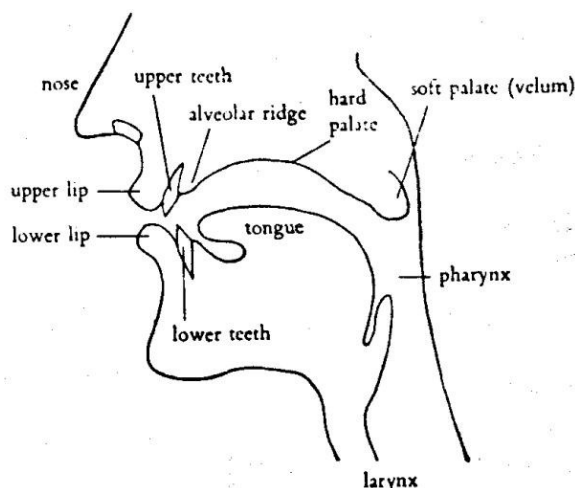


The production of speech sounds

Articulators above the larynx:

The different parts of the vocal tract are called articulators and the study of them is called articulatory phonetics.



The main seven articulators that are used in speech:

1. Pharynx البلعوم:

The pharynx is a tube الحنجرة above the larynx أنبوب/قناة. It is about 7 cm long in women and 8cm in men. Its top end is divided into 2 parts:

- a. One part represents the back of the oral cavity.
- b. The second part lead to the nasal cavity التجويف الانفي

2. The Velum (soft palate): الحنك الرخو/اللين

The soft palate has two important functions:

- a. It allows air to pass through the nose and through the mouth (nasal cavity or oral cavity)
- b. It can be touched by the tongue making velar حلقى consonants such as k and g.

3. The Hard Palate: الحنك الصلب

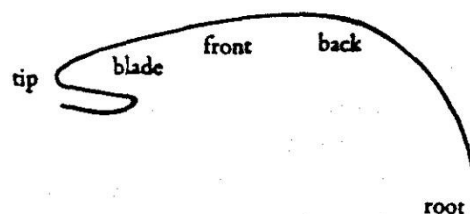
The hard palate is between alveolar ridge اللثة and soft palate. It is called "the roof of the mouth". We can feel its curved surface سطحه الأملس with our tongue.

4. The Alveolar Ridge: اللثة

It is between the front teeth and the hard palate. It can be touched by the tongue making alveolar consonants as t and d.

5. The Tongue: اللسان

It is a very important articulator which can be moved into different places and different shapes. The tongue is divided into different parts; tip, blade, front, back and root.

**6. The teeth:** الأسنان

The teeth (upper and lower) are at the front of the mouth behind the lips.

- The upper teeth can be touched by the tongue for producing dental أسنانية consonants (θ , δ)
- The teeth can be touched by the lower lip for making labiodental consonants أسنانية شفاهية (f , v)

7. The lips:

The lips are important in speech.

- a. They can be pressed together making bilabial شفاهية consonants (p, b, m)
- b. They can also be touched by the teeth making labiodental consonants such as (f, v)

→ Other parts that sometimes can be described as articulators:

- The larynx can also be described as an articulator which has a very important function in speech.
- Jaws الفك are sometimes called articulators as we move the lower jaw a lot in speaking. Jaws are not articulators in the same way as the others because they aren't themselves make contact with other articulators.
- Although nose and nasal cavity are also very important for making sounds, but we cannot described them as articulators.

Vowels and Consonants:

→ Vowels:

Vowels are sounds in which there is no obstruction إعاقة to the airflow مجرى الهواء through its passage from the larynx to the lips.

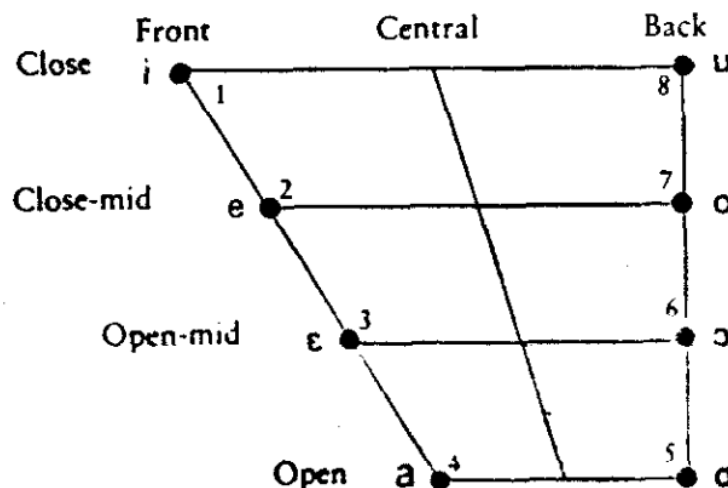
→ Consonants:

Consonants are sounds in which there is partial or wholly obstruction إعاقة جزئية أو كلية to the airflow through its passage from the larynx to the mouth

→ Cardinal vowels: الحروف المتحركة الأساسية

Cardinal vowels are a reference system نظام مرجعي. They represent a useful way of describing, classifying تصنيف and comparing vowels. Primary cardinal vowels are familiar to the speakers of European languages.

"Primary Cardinal Vowels"



⇒ Cardinal vowel [i] is defined as close-front vowel.

⇒ Cardinal vowel [u] is fully close and back.

⇒ Cardinal vowel [a] is fully open and front.

Different shapes of the lips:**a. Rounded مستديرة:**

Where the corners of the lips are brought together and pushed forwards as in the cardinal vowel [U, O]

b. Spread منتشرة:

The corners of the lips are moved away from each other as in the cardinal vowel [i] as in "smile"

c. Neutral الثبات:

Where the lips are not noticeably rounded or spread as "er"

English Short Vowels

English has a large number of vowel sounds. The first ones are short vowels.

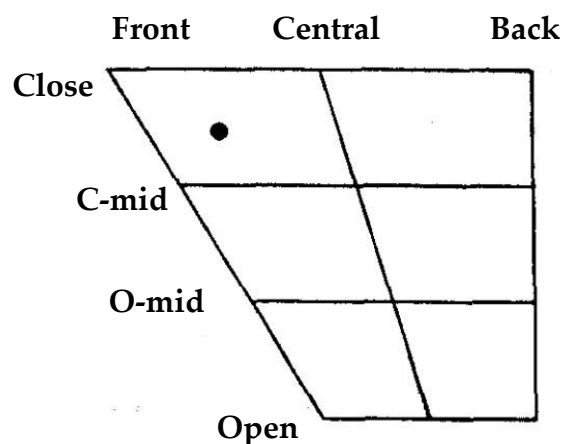
The symbols of short vowels are (I, e, æ, ^, D, v). Each vowel is described in relation to the cardinal vowels.

I

⇒ This vowel is in the close area.

⇒ The lips are slightly spread.

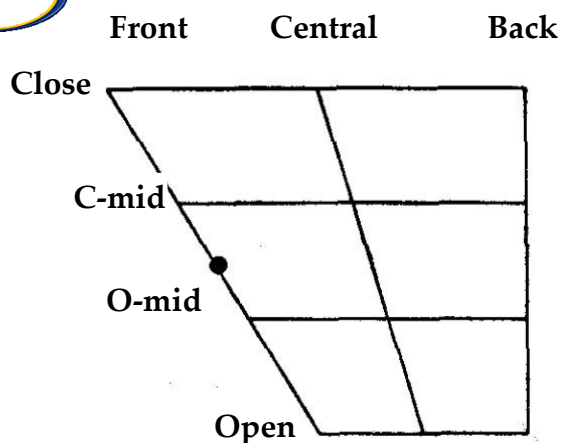
Such as: sit /sIt/, fish /fIʃ/, sick /sIk/



e

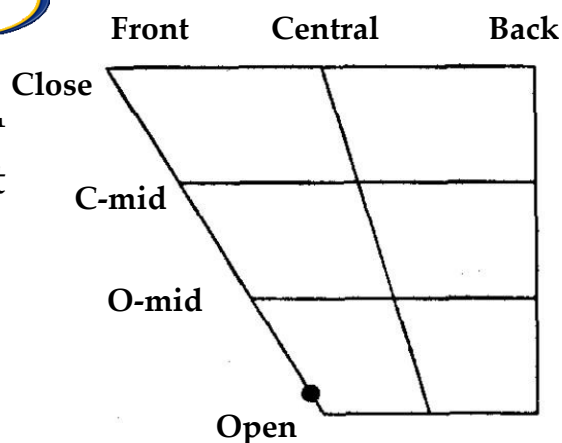
⇒ It is a front vowel between close-mid and open-mid front area.

⇒ The lips are slightly spread.
Such as: **bed, men, yes, met.**

**æ**

⇒ It is a front vowel between open-mid and open front area.

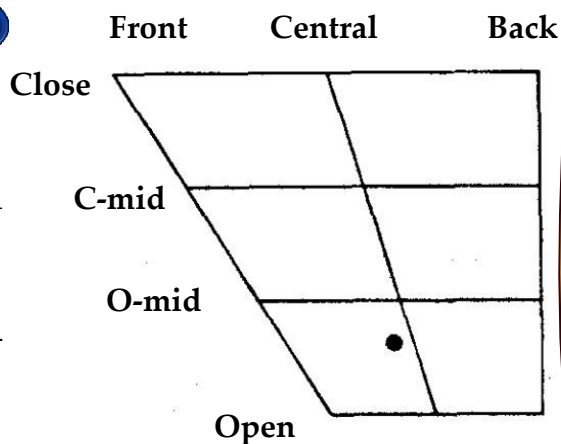
⇒ The lips are slightly spread.
Such as: **bat /bæt/, mat, cat.**

**ʌ**

⇒ It is a central and open vowel.

⇒ The lips are in neutral position. وضع ثابت

Such as: **up /ʌp/, blood /blʌd/, cut /cʌt/, but /bʌt/**

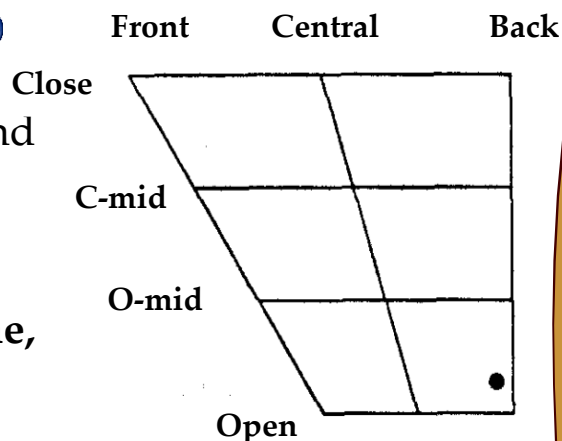


D

⇒ It is between the open-mid and open back area.

⇒ The lips are slightly round.

Such as: on /Dn/, fox, box, gone, off, stop.

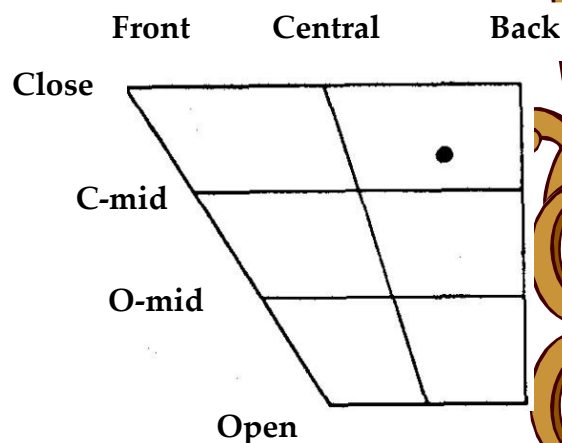
**U**

⇒ It is a high back vowel.

⇒ It is more open and nearer to the central.

⇒ The lips are rounded

Such as: would /wUd/, should /sUd/, good, push



→ There is another short vowel called schwa [ə]. It is a central vowel which can be heard at the first syllable of the word "about", for example.

Long vowels, diphthongs and triphthongs

Long vowels

Long vowels are tend to be longer and stronger than short vowels. Long vowels are [i:, a:, ɜ:, ɔ:, U:]

i: إِي ↪ see /si:/

a: أَ ↪ card /ca:d/

U: أُ ↪ food /fU:d/

ɜ: اَ ↪ bird /bɜ:d/

ɔ: اُ ↪

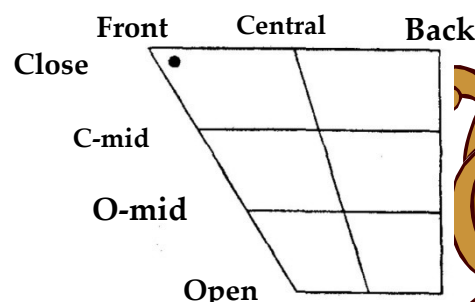
torn /tɔ:n/

i:

⇒ it is more close and front than [I]

⇒ The lips are slightly spread.

Such as: beat /bi:t/, team, feel.

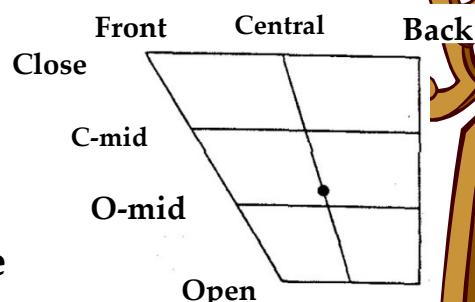


ɜ:

⇒ It is a fully central vowel.

⇒ The lips are in neutral position.

Such as: bird /bɜ:d/, girl, earth, purse



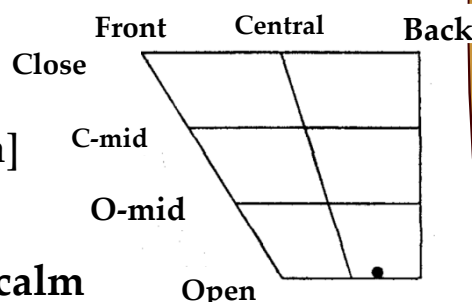
a:

⇒ It is an open vowel.

⇒ It is not as back as cardinal vowel [a]

⇒ The lips are in neutral position.

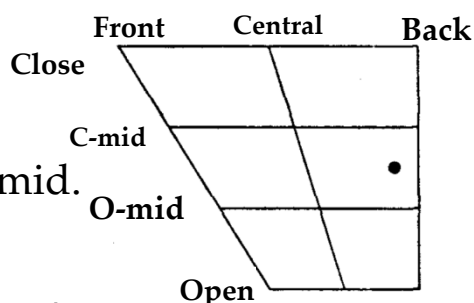
Such as: car /Ka:/, card /ka:d/, fast, calm



ɔ:

- ⇒ It's almost fully back.
- ⇒ It's between close-mid and open-mid.
- ⇒ The lips are quite rounding.

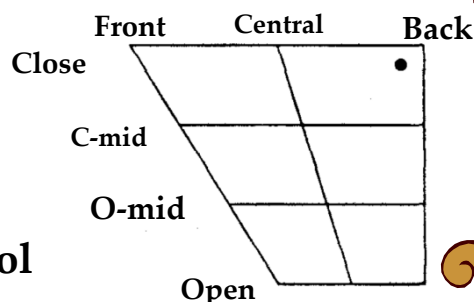
Such as: or /ɔ:/, for /fɔ:/, horse /hɔ:s/



u:

- ⇒ It's not fully close nor fully back.
- ⇒ The lips are rounded.

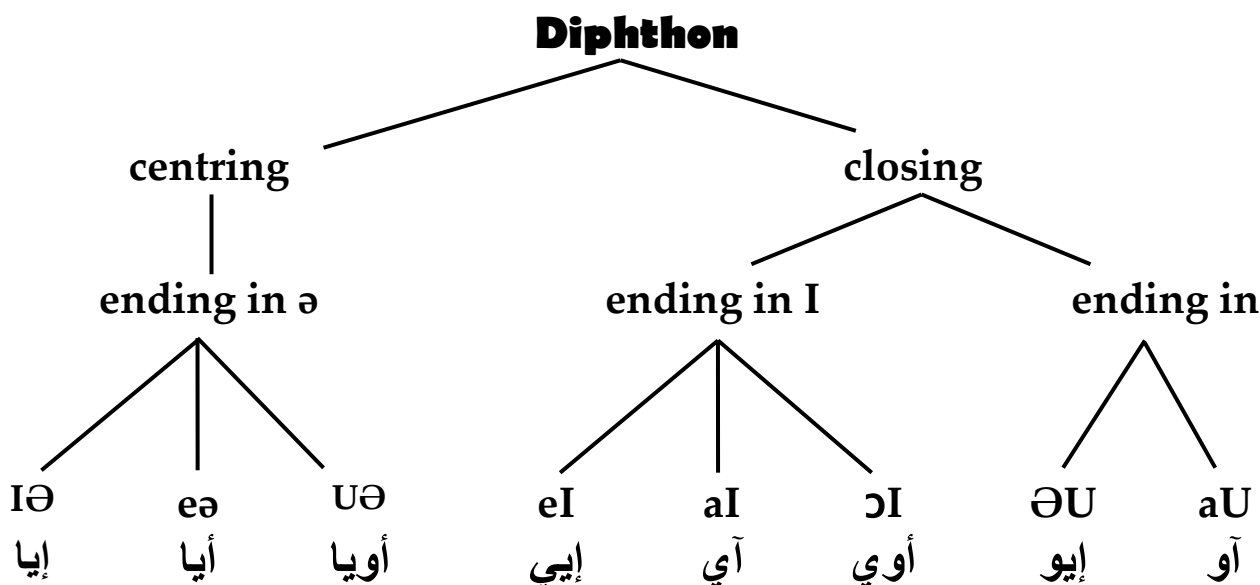
Such as: food /fu:d/, two /tu:/, school



Diphthongs

إضغام حرفين

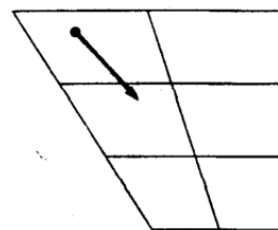
Diphthongs are sounds which consist of a movement or a glide from one vowel to another. A vowel which does not glide is called a **pure vowel**. In diphthongs, the first part is longer and stronger than the second part. There are 8 diphthongs.



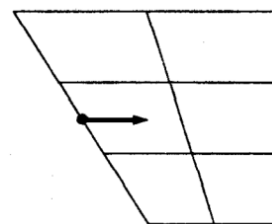
- ↪ The closing diphthongs end with a glide towards a closer vowel. Because the second part of the diphthong is weak, they don't reach closer position. (I)

Iə

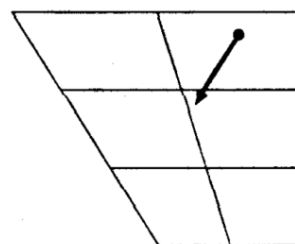
- ⇒ It begins with the vowel [I].
⇒ It glides to the center [ə]
Such as: here /hIə/, bear, dear

**eə**

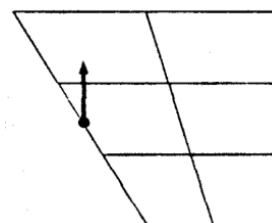
- ⇒ It begins with the (e) and glides towards (ə)
Such as: air /eə/, there /ðeə/, hair, fair, pair

**ʊə**

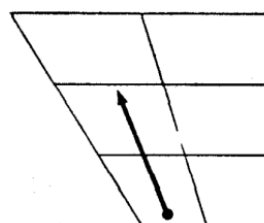
- ⇒ It begins with the vowel (ʊ).
⇒ It glides to the center (ə)
Such as: sure, tour, poor, moor

**eɪ**

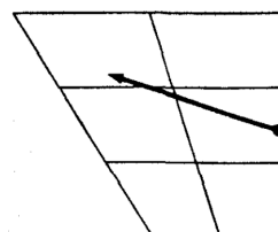
- ⇒ This diphthong begins with the vowel (e)
⇒ It glides to closer position (ɪ).
such as: play, pain, aim, make, face

**aɪ**

- ⇒ It begins with an open vowel which is between front and back quite similar to the ^ of the words "cut", "bun"
⇒ Such as: I, fly, time, bite, flight

**ɔɪ**

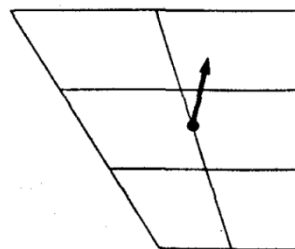
- ⇒ It begins with the long vowel ɔ:
Such as: boy, voice, coin, avoid, point



əʊ

- ⇒ It begins with the position of ə.
- ⇒ It glides to the closer and back position U.
- ⇒ The lips are slightly rounded.

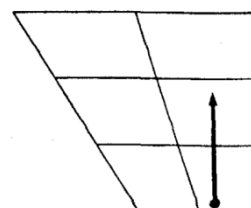
Such as: **go, no, most, home, hope**



aʊ

- ⇒ It begins with a: and glides to closer U.
- ⇒ The lips are slightly rounded.

Such as: **now, cow, loud, house, about**



Triphthongs

Triphthongs are the most complex English sounds. A triphthong is a glide from one vowel to another and then to a third, all produced rapidly and without interruption.

Hour: begins with a vowel quality (a:) glides towards the back close rounded area (U) then ends with a mid-central vowel (ə) for producing the triphthong (aʊə)

Symbols of Triphthongs:

- | | | |
|----------------|------|----------------------------|
| → eɪ + ə = eɪə | إيا | ⇒ player /pleɪə/, layer |
| → aɪ + ə = aɪə | آيا | ⇒ fire /faɪə/, liar, flyer |
| → ɔɪ + ə = ɔɪə | أويا | ⇒ loyal /ləɪə/, royal |
| → əʊ + ə = əʊə | أوا | ⇒ lower /ləʊə/ |
| → aʊ + ə = aʊə | أوا | ⇒ power /paʊə/ |

Fright	aɪ	Style	aɪ	They	eɪ
Home	əʊ	Way	eɪ	Why	aɪ
Clear	Iə	Tone	əʊ	Foot	U
Cow	kaʊ	Out	aʊ	Mat	æ
Team	i:	Coin	ɔɪ	Lower	əʊə
Word	3:	Stop	D	Rough	ʌ

Voicing and Consonants

1. The Larynx

The larynx has several very important functions in speech.

- The main structure of the larynx is made of cartilage غضروف; a material that is similar to bone عظم but less hard.
- The larynx's structure is made of two large cartilages. These cartilages are hollow and are attached to the top of the trachea القصبة الهوائية.
- When we breathe, the air passes through the trachea and larynx.
- The two large cartilages are thyroid الغدة الدرقية cartilage and arytenoid cartilage.

→ The vocal folds (cords)

- Inside the box صندوق الحنجرة, there are the vocal cords which are two thick flaps of muscle عضله like a pair of lips.
- At the front, the vocal folds are joined together and fixed to the inside of the thyroid cartilage غضروف الغدة الدرقية.
- At the back, they are attached متصلين to the arytenoid cartilage, so that if the arytenoid cartilage moves, the vocal folds will move too.

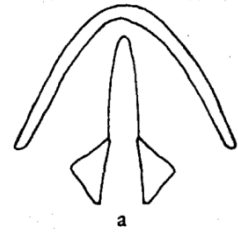
→ Glottis: (فتحة في اعلى الحنجرة) المزمار

- Glottis refers to the opening الفتحة between the vocal folds.
- If the vocal folds are apart, the glottis is open, and if they are pressed together, the glottis is close.
- We can produce a very complex range of changes in the vocal folds and their positions

⇒ The states of the vocal cards:

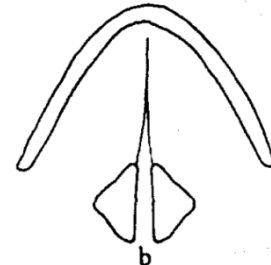
a) Wide apart متباعدين (wide glottis):

The vocal folds are wide apart for normal breathing and usually during voiceless consonants such as (p, t, k, f, s)



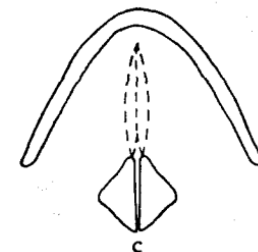
b) Narrow glottis:

If air is passed through the glottis when it is narrowed ضيق, the result is a voiceless glottal fricative (h)



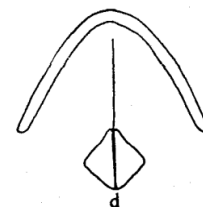
c) Position for vocal fold vibration:

When the edges of the vocal folds are touching each other, air passing through the glottis will cause vibration. Air is pressed up from the lungs and this air pushes the vocal folds apart so that a little air escapes.



d) Vocal folds tightly closed:

The vocal folds can be pressed together so that the air cannot pass between them. This is called a glottal stop or glottal plosives for which we use the symbol /ʔ/



2. Respiration التنفس and voicing

"مش مهمه بس ممكن تقرأها تأخذ فكره"

- The lungs are like sponge إسفنج that can fill with air and they are within the rib cage القفص الصدري.
- If the rib cage is lifted upwards and outwards, the lungs can expand and take in more air.
- If we allow the rib cage to return to its rest position, the air is expelled يُقذف/يُزفر and can be used for producing speech sounds.

- When saying along sentence without interruption, we can make the rib cage press down on the lungs , so that more air is expelled.

The different sorts of vibrations:

When we think of the difference in the quality of our voice between singing, shouting and speaking quietly, we find that many differences are made with the larynx, and there are 3 main differences:

1. Variations in intensity :التنوع والاختلاف في الشدة/الكثافة:

We produce voicing with high intensity for shouting, and with low intensity for speaking quietly.

2. Variations in frequency :التردد:

If the vocal folds vibrate rapidly, the voicing is at high frequency. If there are fewer vibrations per second, the frequency is lower.

3. Variations in quality:

We can produce different voice qualities such as those we might call harsh, breathy, murmured or creaky.

3. Plosives

الأصوات الانفجارية

A plosive is consonant articulation and there are four phases describe the plosives:

1) The closure phase :مرحلة حبس النفس

The first phase is when the articulators move to form the closure for the plosive.

2) The hold phase:مرحلة الإمساك

The second phase is when the compressed air is stopped from escaping.

3) The release phase:مرحلة الإندفاع

The third phase is when the articulators - which are used to form the closure, move to allow air to escape

4) The post-release phase: مرحلة ما بعد الإندفاع

The fourth phase is what happens immediately after the third phase.

4. English Plosives

English has six plosive consonants (**p, b, t, d, k, g**). The glottal plosive [ʔ] is of less importance as it is usually an alternative بديل pronunciation of [p, t or k].

The plosives have different places of articulation:

➤ [**P, b**]: are bilabial شفاهية; the lips are pressed together.

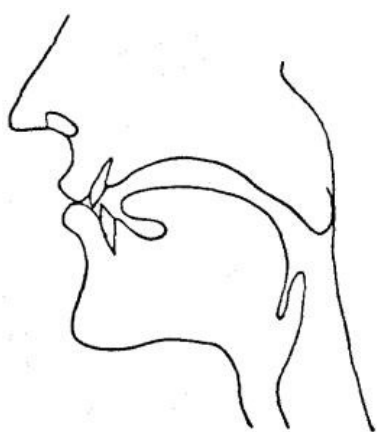
EX: pie, buy, my

➤ [**t, d**]: are alveolars; the tongue-tip is pressed against the alveolar ridge.

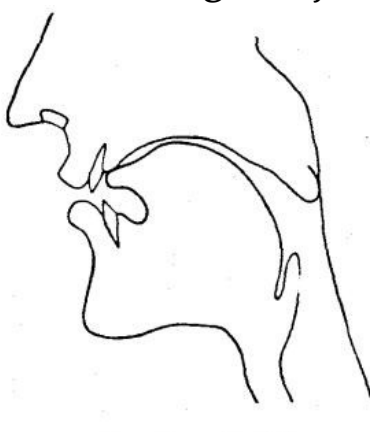
EX: tie, die

➤ [**k, g**]: are velar; the back of the tongue is pressed against the soft palate.

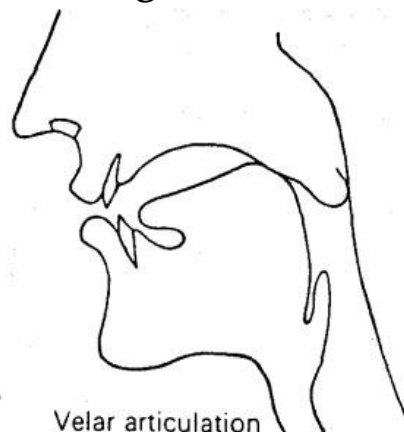
EX: back / bæk/, hang /hæŋ/, hack, hag



Bilabial articulation



Alveolar articulation



Velar articulation

➤ [p, t and k] are always voiceless.

➤ [b, d and g] are sometimes fully voiced.

All six plosives can occur at the beginning of a word (**initial position**), between other sounds (**medial position**) and at the end of a word (**final position**).

5. Fortis and Lenis→ **Fortis:**

The voiceless plosives [p, t, k] are called fortis (meaning 'strong') which are produced with more force.

→ **Lenis:**

The voiced plosives [b, d, g] are called lenis (meaning 'weak').

The plosive phonemes of English can be presented in the following table:

	Place of articulation		
	Bilabial	Alveolar	velar
Fortis "voiceless"	p	t	k
Lenis "voiced"	b	d	g

Some words with transcription

that	ðæt	however	haʊevə
difficult	dɪfɪkəlt	another	ənʌðə
you	ju:	again	əgen
which	wɪtʃ	world	wɜ:ld
their	ðeə	area	eəriə
about	əbaʊt	psychology	saɪkɒlədʒi
photo	fəʊtəʊ	course	kɔ:s
should	ʃʊd	company	kʌmpəni
people	pi:pəl	under	ʌndə
also	ɔ:lsəʊ	problem	prɒbləm
between	bɪtwi:n	never	nevə
many	meni	service	sɜ:vɪs
thicker	θɪkə	something	sʌmθɪŋ
child	tʃaɪld	place	pleɪs
hear	hɪə	point	pɔɪnt
system	sɪstəm	provide	prə'vaɪd
group	gru:p	large	lɑ:dʒ
number	nʌmbə	general	dʒenərəl
always	ɔ:lweɪz	head	hed
next	nekst	information	ɪnfəmeɪʃən
quick	kwɪk	question	kwestʃən
nervous	nɜ:vəs	business	bɪznɪs
local	ləʊkəl	power	paʊə
during	dʒʊərɪŋ	change	tʃeɪndʒ
although	ɔ:lðəʊ	move	mu:v
who	hu:	book	bʊk

example	ɪgzæmpəl	development	dɪveləpmənt
rather	ræðə	young	jʌŋ
social	səʊʃəl	national	næʃənəl
write	raɪt	water	wɔːtə
percent	pəsent	yet	jet
guest	gest	perhaps	pəhæps
both	bəʊθ	until	ʌntɪl
every	evri	control	kəntroʊl
month	mʌnθ	include	ɪnklud
important	ɪmpɔːtənt	believe	bɪliːv
allow	əlaʊ	person	pɜːsən
stand	stænd	once	wʌns
idea	aɪdiːə	police	pəliːs
character	kærɪktə	lose	luːz
result	rɪzʌlt	position	pəzɪʃən
happen	hæpən	industry	ɪndəstri
friend	frend	major	meɪdʒə
carry	kæri	build	bɪld
awful	ɔːfəl	language	læŋɡwɪdʒ
early	ɜːli	international	ɪntə næʃənəl
view	vjuː	else	els
himself	hɪmself	yeah	jeə
xerox	zɪərɒks	center	sɛntə
report	rɪpɔːt	enough	ɪnʌf
political	pəlɪtɪkəl	calm	kɑːm
law	lɔː	color	kʌlə
ghost	ɡəʊst	lure	lʊə